Complete Summary

GUIDELINE TITLE

Antithrombotic therapy in children. In: Sixth ACCP Consensus Conference on Antithrombotic Therapy.

BIBLIOGRAPHIC SOURCE(S)

Monagle P, Michelson AD, Bovill E, Andrew M. Antithrombotic therapy in children. Chest 2001 Jan;119(1 Suppl):344S-370S. [350 references]

COMPLETE SUMMARY CONTENT

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SCOPE

DISEASE/CONDITION(S)

1. Thromboembolic disorders, including the following:
    - Venous thromboembolic complications
    - Arterial thromboembolic complications
    - Myocardial infarction
    - Some forms of strokes
2. Conditions, diseases or interventions that predispose a patient to thromboembolism, including the following:
    - Mechanical or biological prosthetic heart valves
    - Cardiac catheterization
    - Central arterial catheters
    - Endovascular stents
    - Blalock-Taussig shunts
    - Fontans
    - Central venous catheters
    - Atrial venous fibrillation
    - Kawasaki's disease
    - Cardiopulmonary bypass
    - Extra/corporeal membrane oxygenation

- Hemodialysis
- Continuous venovenous hemoperfusion

GUIDELINE CATEGORY

Management
Prevention
Treatment

CLINICAL SPECIALTY

Cardiology
Critical Care
Emergency Medicine
Family Practice
Pediatrics
Pulmonary Medicine

INTENDED USERS

Physicians

GUIDELINE OBJECTIVE(S)

- To present evidence-based clinical practice guidelines to assist clinicians in preventing and effectively treating thrombotic disorders in specific pediatric patient populations

TARGET POPULATION

Pediatric patients who are candidates for antithrombotic therapy

INTERVENTIONS AND PRACTICES CONSIDERED

Prevention or Treatment

Pharmacotherapy:

1. Heparin
2. Low-molecular-weight heparin (such as, reviparin and enoxaparin)
3. Protamine sulfate to reverse heparin therapy
4. Oral anticoagulation therapy
5. Reversal of oral anticoagulation therapy with vitamin K1
6. Aspirin therapy
7. Oral anticoagulation therapy in combination with aspirin therapy and/or dipyridamole
8. Thrombolytic agents (tissue plasminogen activator, streptokinase, urokinase)

Note:

- The following alternative antithrombotic therapies in children are considered but not recommended: danaparoid and lepirudin.
- The following antiplatelet therapies are considered but not recommended: ticlopidine and clopidogrel, and Glycoprotein (GP) IIb/IIIa antagonists (abciximab, tirofiban, and eptifibatide).

Other Related Treatment

1. Treatment of Bleeding:
    - Transfusions of platelet concentrates and/or the use of products that enhance platelet adhesion
    - Stopping an infusion of the thrombolytic agent, followed by administering a cryoprecipitate, other blood products as indicated, or antifibrinolytic agent
2. Fresh frozen plasma or protein C concentrate

Management: Oral Anticoagulation Monitoring

1. Pediatric anticoagulation clinics
2. Whole-blood prothrombin time/international normalized ratio monitors for home use

MAJOR OUTCOMES CONSIDERED

Efficacy and safety of treatments, as evidenced by the following:

- Rates of thromboembolic complications
- Rates of hemorrhagic complications

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

MEDLINE searches of the literature were conducted from 1966 to 1999 using combinations of key words (for example, children, newborns, heparin, warfarin, aspirin, antiplatelet agents, thrombolysis, thrombosis, embolism, and mechanical and biological prosthetic heart valves) and were supplemented by additional references located through the bibliographies of listed articles.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

The rating scheme framework captures the trade-off between benefits and risks (1 or 2) (see "Rating Scheme for the Strength of the Recommendations") and the methodologic quality of the underlying evidence (A, B, C+, or C).

Grades of evidence for antithrombotic agents:

1A
Methodological strength of supporting evidence: randomized controlled trials without important limitations

1B
Methodological strength of supporting evidence: randomized controlled trials with important limitations (inconsistent results, methodologic flaws*)

1C+
Methodological strength of supporting evidence: no randomized controlled trials, but randomized controlled trial results can be unequivocally extrapolated; or, overwhelming evidence from observational studies

1C
Methodological strength of supporting evidence: observation studies

2A
Methodological strength of supporting evidence: randomized controlled trials without important limitations

2B
Methodological strength of supporting evidence: randomized controlled trials with important limitations (inconsistent results, methodologic flaws*)

2C
Methodological strength of supporting evidence: observational studies

* Such situations include randomized controlled trials with lack of blinding, and subjective outcomes, in which the risk of bias in measurement of outcomes is high; and randomized controlled trials with large loss to follow-up.

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Consensus Development Conference)

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

The strength of any recommendation depends on two factors: the trade-off between benefits and risks, and the strength of the methodology that leads to estimates of the treatment effect. The rating scheme used for this guideline captures these factors. The guideline developers grade the trade-off between benefits and risks in two categories: (1) the trade-off is clear enough that most patients, despite differences in values, would make the same choice; and (2) the trade-off is less clear, and each patient's values will likely lead to different choices.

When randomized trials provide precise estimates suggesting large treatment effects, and risks and costs of therapy are small, treatment for average patients with compatible values and preferences can be confidently recommended.

If the balance between benefits and risks is uncertain, methodologically rigorous studies providing grade A evidence and recommendations may still be weak (grade 2). Uncertainty may come from less precise estimates of benefit, harm, or costs, or from small effect sizes.

There is an independent impact of validity/consistency and the balance of positive and negative impacts of treatment on the strength of recommendations. In situations when there is doubt about the value of the trade-off, any recommendation will be weaker, moving from grade 1 to grade 2.

Grade 1 recommendations can only be made when there are precise estimates of both benefit and harm, and the balance between the two clearly favors recommending or not recommending the intervention for the average patient with compatible values and preferences. Table 2 of the original guideline document summarizes how a number of factors can reduce the strength of a recommendation, moving it from grade 1 to grade 2. Uncertainty about a recommendation to treat may be introduced if the target event that is trying to be prevented is less important (confident recommendations are more likely to be made to prevent death or stroke than asymptomatic deep venous thrombosis); if the magnitude of risk reduction in the overall group is small; if the risk is low in a particular subgroup of patients; if the estimate of the treatment effect, reflected in a wide confidence interval (CI) around the effect, is imprecise; if there is substantial potential harm associated with therapy; or if there is an expectation for a wide divergence in values even among average or typical patients. Higher costs would also lead to weaker recommendations to treat.

The more balanced the trade-off between benefits and risks, the greater the influence of individual patient values in decision making. If they understand the benefits and risks, virtually all patients will take aspirin after myocardial infarction or will comply with prophylaxis to reduce thromboembolism after hip replacement. Thus, one way of thinking about a grade 1 recommendation is that variability in

patient values or individual physician values is unlikely to influence treatment choice in average or typical patients.

When the trade-off between benefits and risks is less clear, individual patient values will influence treatment decisions even among patients with average or typical preferences.

Grade 2 recommendations are those in which variation in patient values or individual physician values will often mandate different treatment choices, even among average or typical patients.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

The rating scheme framework captures the trade-off between benefits and risks (1 or 2) and the methodologic quality of the underlying evidence (A, B, C+, or C) (see "Rating Scheme for the Strength of the Evidence").

Grades of recommendation for antithrombotic agents:

1A
Clarity of risk/benefit: risk/benefit clear
Implications: strong recommendation; can apply to most circumstances, without reservation

1B
Clarity of risk/benefit: risk/benefit clear
Implications: strong recommendation; likely to apply to most patients

1C+
Clarity of risk/benefit: risk/benefit clear
Implications: strong recommendation; can apply to most patients in most circumstances

1C
Clarity of risk/benefit: risk/benefit clear
Implications: intermediate-strength recommendation; may change when stronger evidence available

2A
Clarity of risk/benefit: risk/benefit unclear
Implications: intermediate strength recommendation; best action may differ, depending on circumstances or patients' societal values

2B
Clarity of risk/benefit: risk/benefit unclear
Implications: weak recommendation; alternative approaches likely to be better for some patients under some circumstances

2C
Clarity of risk/benefit: risk/benefit unclear

Implications: very weak recommendation; other alternatives may be equally reasonable

COST ANALYSIS

While the American College of Chest Physicians conference participants considered cost in deciding on the strength of recommendations, the paucity of rigorous cost-effective analyses and the wide variability of costs across jurisdictions led the guideline developers to take a conservative approach to cost issues. That is, cost considerations influenced the recommendations and the grades of those recommendations only when the gradient between alternatives was very large.

METHOD OF GUIDELINE VALIDATION

Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The initial guidelines were prepared by the chapter committee (the primary authors) and then reviewed separately by the Committee Co-Chairs and methodology experts and finally by the entire group of Consensus Guideline participants.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Please note: This guideline has been updated. The National Guideline Clearinghouse (NGC) is working to update this summary. The recommendations that follow are based on the previous version of the guideline.

Excerpted by the National Guideline Clearinghouse (NGC):

The grading scheme is defined at the end of the Major Recommendations.

Venous Thromboembolic Disease in Children

First Thromboembolism

The guideline developers recommend that children (older than 2 months of age) who have had an initial thromboembolism should be treated in the short term with doses of intravenous heparin that are sufficient to prolong the activated partial thromboplastin time to a range that corresponds to an anti-factor Xa level of 0.3 to 0.7 units per mL, or with doses of low-molecular-weight heparin that are sufficient to achieve an anti-factor Xa level of 0.5 to 1.0 units per mL 4 hours after an injection (grade 1C+).

The guideline developers recommend that initial treatment with heparin or low-molecular-weight heparin should be continued for 5 to 10 days. For patients in whom subsequent oral anticoagulant therapy will be used, it can be started as

early as day 1 and heparin/low-molecular-weight heparin therapy discontinued on day 6 if the international normalized ratio is therapeutic on 2 consecutive days. For massive pulmonary thromboembolism or extensive deep venous thrombosis, a longer period of heparin or low-molecular-weight heparin therapy should be considered (grade 1C+).

The guideline developers recommend that anticoagulant therapy should be continued for at least 3 months using oral anticoagulants to prolong the prothrombin time to a target international normalized ratio of 2.5 (range, 2.0 to 3.0) or, alternatively, using low-molecular-weight heparin to maintain an anti-factor Xa level of 0.5 to 1.0 units per mL (grade 2C).

For children who have experienced an idiopathic thromboembolism, the guideline developers recommend that treatment be continued for at least 6 months with either oral anticoagulants or low-molecular-weight heparin (grade 2C).

Following the initial 3 months of therapy, for children with a first central venous line-related deep venous thrombosis, the guideline developers recommend prophylactic doses of oral anticoagulants (international normalized ratio, 1.5 to 1.8) or low-molecular-weight heparin (anti-factor Xa levels, 0.1 to 0.3) as an option until the central venous line is removed (grade 2C).

Recurrent Thromboembolism

For recurrent non-central venous line-related thromboembolism, following the initial 3 months of therapy (recommendation, 1 to 3 months), the guideline developers recommend that indefinite therapy with either therapeutic or prophylactic doses of oral anticoagulants or low-molecular-weight heparin be used (grade 2C).

For recurrent central venous line-related thromboembolism, following the initial 3 months of therapy, the guideline developers recommend that prophylactic doses of oral anticoagulants (international normalized ratio, 1.5 to 1.8) or low-molecular-weight heparin (anti-factor Xa level, 0.1 to 0.3) be continued until removal of the central venous line. If the recurrence occurs while the patient is receiving prophylactic therapy, the guideline developers recommend that therapeutic doses be continued until the central venous line is removed or for a minimum of 3 months (all grade 2C).

Primary Prophylaxis for Venous Thromboembolism in Children

The guideline developers do not recommend primary prophylaxis for children with central venous lines in general at this time, because there is no evidence for the efficacy or safety of this approach (grade 2C).

Remark: Short-term prophylactic anticoagulation therapy in high-risk situations such as immobility, significant surgery, or trauma is an option for children with known congenital prothrombotic disorders. However, according to the American College of Chest Physicians, to its knowledge, there are no published data on which to base a formal recommendation.

Venous Thromboembolic Disease in Newborns

Remark: There are insufficient data to make specific recommendations about anticoagulation therapy in the treatment of newborns with deep venous thrombosis and pulmonary thromboembolism. Options include conventional anticoagulation therapy in age-appropriate doses, short-term anticoagulation therapy, or close monitoring of the thrombus with objective tests and use of anticoagulation therapy if thrombus extension occurs.

If anticoagulation therapy is used, the guideline developers recommend a short course (10 to 14 days) of intravenous heparin that is sufficient to prolong the activated partial thromboplastin time to the therapeutic range that corresponds to an anti-factor Xa level of 0.3 to 0.7 units per mL, or, alternatively, a short course of low-molecular-weight heparin that is sufficient to achieve an anti-factor Xa level at the low end of the adult therapeutic range (0.5 to 1.0 units per mL) may be used (all grade 2C compared to no treatment). Longer courses of anticoagulant therapy, up to 3 months, may be required dependent on the location and extent of the thrombus. The thrombus should be closely monitored with objective tests for evidence of extension or recurrent disease. If the thrombus extends following discontinuation of heparin therapy, the guideline developers recommend oral anticoagulation therapy or extended low-molecular-weight heparin therapy (grade 2C).

Thrombolytic Therapy for Venous Thromboembolic Disease

Remark: There are insufficient data to make specific recommendations about the use of thrombolytic agents in the treatment of venous thromboembolism in neonates or children. Treatment needs to be individualized. If thrombolytic therapy is used, in the presence of physiologic or pathologic deficiencies of plasminogen, the guideline developers recommend supplementation with plasminogen (fresh frozen plasma) (grade 2C).

Congenital Prothrombotic Conditions

Homozygous PC-Deficient and PS-Deficient Patients

The guideline developers recommend that newborns with purpura fulminans due to a homozygous deficiency of protein C or protein S may be treated initially with replacement therapy (either fresh frozen plasma or protein C concentrate) for approximately 6 to 8 weeks until the skin lesions have healed (grade 1C+).

Following resolution of the skin lesions, and under cover of replacement therapy, the guideline developers recommend that oral anticoagulation therapy be introduced with target international normalized ratio values of approximately 3 to 4.5. Treatment duration with oral anticoagulants is indefinite. The guideline developers recommend that replacement therapy with protein C concentrate for protein C-deficient patients may be used for long-term prophylaxis or as salvage therapy for recurrent skin lesions or thrombosis (grade 2C).

The guideline developers recommend that for patients with homozygous protein C and protein S deficiency but with measurable plasma concentrations, low-molecular-weight heparin is a therapeutic option (grade 2C).

Treatment of Arterial Thromboembolism

Cardiac Catheterization

The guideline developers recommend that newborns and children requiring cardiac catheterization via an artery should undergo intravenous heparin prophylaxis (grade 1A).

The guideline developers recommend heparin doses of 100 to 150 units per kg as a bolus (grade 2A compared with 50 units per kg).

Remark: The initial dose and further administration of heparin therapy need further evaluation before definite recommendations can be given, in particular in small infants having procedural catheters.

The guideline developers recommend that clinicians not use aspirin alone (grade 1B).

Arterial Thromboembolism

The guideline developers recommend that children or neonates with an arterial thromboembolism be treated with therapeutic doses of intravenous heparin (grade 1C).

Remark: There are insufficient data to make a recommendation about the optimal duration of therapy.

The guideline developers recommend that children or neonates with limb-threatening or organ-threatening arterial thromboembolism who fail to respond to initial heparin therapy, and who have no known contraindications, be treated with thrombolytic therapy (grade 1C).

Remark: The use of surgery to treat arterial thrombosis in children should be individualized. There are insufficient data to make specific recommendations in children.

Treatment of Kawasaki's Disease in Children

In addition to intravenous gamma globulin (2 g/kg as a single dose), children with Kawasaki's disease should receive aspirin, 80 to 100 mg/kg/day, during the acute phase (up to 14 days) as an anti-inflammatory agent, then aspirin, 3 to 5 mg/kg/day, for at least 7 weeks to prevent the formation of coronary aneurysm thrombosis (grade 1C).

Prosthetic Heart Valves in Children

Biological Prosthetic Heart Valves in Children

Children with biological prosthetic heart valves should be treated following adult recommendations and observed for evidence of valve dysfunction.

Mechanical Prosthetic Heart Valves in Children

The guideline developers recommend that children with mechanical prosthetic heart valves receive oral anticoagulation therapy (grade 1C+).

The guideline developers recommend levels of oral anticoagulation therapy that prolong the target international normalized ratio to 3.0 (range, 2.5 to 3.5) (grade 1C+).

For children with mechanical prosthetic heart valves who suffer systemic embolisms despite adequate therapy with oral anticoagulation therapy, the guideline developers recommend the addition of aspirin, 6 to 20 mg/kg/day, to the regimen. Dipyridamole, 2 to 5 mg/kg/day, in addition to oral anticoagulation therapy is an alternative option (all grade 2C).

When full-dose oral anticoagulation therapy is contraindicated, the guideline developers recommend long-term therapy with oral anticoagulation sufficient to increase the international normalized ratio to 2.5 (range, 2.0 to 3.0) in combination with aspirin, 6 to 20 mg/kg/day, (grade 1C+) and dipyridamole, 2 to 5 mg/kg/day (grade 2C).

Other Cardiac Disorders

Blalock-Taussig Shunts

The guideline developers recommend the initial treatment of patients with Blalock-Taussig shunts with therapeutic amounts of heparin, followed by treatment with aspirin, at doses of 3 to 5 mg/kg/day, indefinitely (grade 2C).

Remark: Further clinical investigation is needed before definitive recommendations can be made.

Fontan Operations

The guideline developers recommend aspirin or therapeutic amounts of heparin followed by oral anticoagulation therapy to achieve a target international normalized ratio of 2.5 (range, 2 to 3) as therapeutic options (grade 2C). The optimal duration of prophylaxis is unknown. Patients with fenestrations may benefit from treatment until closure.

Remark: Further clinical investigation is needed before definitive recommendations for primary postoperative prophylaxis can be made.

The rating scheme framework captures the trade-off between benefits and risks (1 or 2) and the methodologic quality of the underlying evidence (A, B, C+, or C).

Definitions:

Grades of recommendations:

1A

Clarity of risk/benefit: risk/benefit clear
Methodological strength of supporting evidence: randomized controlled trials without important limitations
Implications: strong recommendation; can apply to most circumstances, without reservation

1B

Clarity of risk/benefit: risk/benefit clear
Methodological strength of supporting evidence: randomized controlled trials with important limitations (inconsistent results, methodologic flaws*)
Implications: strong recommendation; likely to apply to most patients

1C+

Clarity of risk/benefit: risk/benefit clear
Methodological strength of supporting evidence: no randomized controlled trials, but randomized controlled trial results can be unequivocally extrapolated; or, overwhelming evidence from observational studies
Implications: strong recommendation; can apply to most patients in most circumstances

1C

Clarity of risk/benefit: risk/benefit clear
Methodological strength of supporting evidence: observation studies
Implications: intermediate-strength recommendation; may change when stronger evidence available

2A

Clarity of risk/benefit: risk/benefit unclear
Methodological strength of supporting evidence: randomized controlled trials without important limitations
Implications: intermediate strength recommendation; best action may differ, depending on circumstances or patients' societal values

2B

Clarity of risk/benefit: risk/benefit unclear
Methodological strength of supporting evidence: randomized controlled trials with important limitations (inconsistent results, methodologic flaws*)
Implications: weak recommendation; alternative approaches likely to be better for some patients under some circumstances

2C

Clarity of risk/benefit: risk/benefit unclear
Methodological strength of supporting evidence: observational studies
Implications: very weak recommendation; other alternatives may be equally reasonable

* Such situations include randomized controlled trials with lack of blinding, and subjective outcomes, in which the risk of bias in measurement of outcomes is high; and randomized controlled trials with large loss to follow-up.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified for each recommendation (refer to "Major Recommendations").

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate use of antithrombotic therapy in selected pediatric populations may help clinicians prevent, manage, and treat thromboembolic complications, while minimizing the risk of adverse effects, such as bleeding, heparin induced thrombocytopenia, and osteoporosis.

POTENTIAL HARMS

Adverse Effects:

- Heparin. There are at least three clinically important adverse effects of heparin, including bleeding, heparin-induced osteoporosis, heparin-induced thrombocytopenia.
- Oral anticoagulant therapy. Bleeding is the main complication of oral anticoagulant therapy. Minor bleeding occurs in approximately 20% of children receiving oral anticoagulants. The risk of serious bleeding in children receiving oral anticoagulants for mechanical prosthetic valves is less than 3.2% per patient-year (13 case series). Significant bleeding complications occur in approximately 1.7% of children receiving oral anticoagulants for other indications. Non-hemorrhagic complications of oral anticoagulants, such as tracheal calcification or hair loss, have been described on rare occasions in young children. Long-term oral anticoagulant therapy may influence bone density in growing children.
- Antiplatelet agents. The clearance of both salicylate and indomethacin is slower in newborns, potentially placing them at risk for bleeding for longer periods of time. In older children, aspirin rarely causes clinically important hemorrhaging, except in the presence of an underlying hemostatic defect or

in children also treated with anticoagulants or receiving thrombolytic therapy. The relatively low doses of aspirin used as antiplatelet therapy, compared to the much higher doses used for anti-inflammatory therapy, seldom cause other side effects. For example, although aspirin is associated with Reye's syndrome, this appears to be a dose-dependent effect of aspirin.

- Thrombolytic Therapy. The incidence of bleeding requiring treatment with packed red blood cells occurs in approximately 20% of pediatric patients. The most frequent problem was bleeding at sites of invasive procedures that required treatment with blood products. Intracranial hemorrhage was found in 14 of 929 patients (1.5%) analyzed. When subdivided according to age, intracranial hemorrhage was identified in 2 of 468 children (0.4%) after the neonatal period, in 1 of 83 term infants (1.2%), and in 11 of 86 preterm infants (13.8%). However, in the largest study of premature infants included in this review, the incidence of intracranial hemorrhage was the same in the control arm, which did not receive thrombolytic therapy.

CONTRAINDICATIONS

CONTRAINDICATIONS

There are well-defined contraindications to thrombolytic therapy in adults. These include a history of stroke, transient ischemic attacks, other neurologic disease, and hypertension. Similar problems in children should be considered as relative, but not absolute, contraindications to thrombolytic therapy.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

Interpreting the Recommendations

The authors of these guidelines offer recommendations that should not be construed as dictates by the readers, including clinicians, third-party payers, institutional review committees, and courts. In general, anything other than a 1A recommendation indicates that the chapter authors acknowledge that other interpretations of the evidence and other clinical policies may be reasonable and appropriate. Even grade 1A recommendations will not apply to all circumstances and all patients. For instance, the guideline developers have been conservative in their considerations of cost, and have seldom downgraded recommendations from 1 to 2 on the basis of expense. As a result, in jurisdictions in which resource constraints are severe, alternative allocations may serve the health of the public far more than some of the interventions that the developers designate grade 1A. This will likely be true for all less-industrialized countries. However, a weak recommendation (2C) that reduces resource consumption may be more strongly indicated in less-industrialized countries.

Similarly, following grade 1A recommendations will at times not serve the best interests of patients with atypical values or preferences. For instance, consider patients who find anticoagulant therapy extremely aversive, either because it interferes with their lifestyle (prevents participation in contact sports, for instance) or because of the need for monitoring. For such patients, clinicians may

reasonably conclude that following some grade 1A recommendations for anticoagulation will be a mistake. The same may be true for patients with particular comorbidities (such as a recent GI bleed or a balance disorder with repeated falls) or other special circumstances (such as very advanced age).

The guideline developers trust that these observations convey their acknowledgment that no guidelines or recommendations can take into account the often compelling idiosyncrasies of individual clinical circumstances. No clinician and no one charged with evaluating the actions of a clinician should attempt to apply their recommendations in a rote or blanket fashion.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Living with Illness
Staying Healthy

IOM DOMAIN

Effectiveness
Safety

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Monagle P, Michelson AD, Bovill E, Andrew M. Antithrombotic therapy in children. Chest 2001 Jan;119(1 Suppl):344S-370S. [350 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2001 Jan

GUIDELINE DEVELOPER(S)

American College of Chest Physicians - Medical Specialty Society

SOURCE(S) OF FUNDING

Funding was supplied by DuPont Pharmaceuticals.

GUIDELINE COMMITTEE

American College of Chest Physicians Consensus Panel on Antithrombotic Therapy

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

Please note: This guideline has been updated. The National Guideline Clearinghouse (NGC) is working to update this summary.

GUIDELINE AVAILABILITY

Electronic copies of the updated guideline: Available from the Chest - The Cardiopulmonary and Critical Care Journal Web site.

Print copies: Available from the American College of Chest Physicians, Products and Registration Division, 3300 Dundee Road, Northbrook IL 60062-2348.

AVAILABILITY OF COMPANION DOCUMENTS

The following is available:

- Sixth ACCP Consensus Conference on Antithrombotic Therapy (2001): quick reference guide for clinicians. Northbrook, IL: ACCP, 2001.

Electronic copies: Available in from the American College of Chest Physicians Web site. (Downloadable files intended for use with Palm OS compatible devices are available.)

Print copies: Available from the American College of Chest Physicians, Products and Registration Division, 3300 Dundee Road, Northbrook IL 60062-2348, or by calling 1 (800) 343-2227.

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on July 30, 2001. The information was verified by the guideline developer on October 31, 2001.

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